PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: MATTHEW B. DERNIER KAPLAN & GILMAN, L.L.P. 900 ROUTE 9 NORTH, SUITE 104 WOODBRIDGE, NJ 07095	# PCT WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43*bis*.1)

	Date of mailing (day/month/year) **1 3 FEB 2007**
Applicant's or agent's file reference 436/10 PCT	FOR FURTHER ACTION See paragraph 2 below

International application No. PCT/US04/40442	International filing date (day/month/year) 03 December 2004 (03.12.2004)	Priority date (day/month/year) 05 December 2003 (05.12.2003)

International Patent Classification (IPC) or both national classification and IPC

IPC: G06K 9/54
USPC: 382/302

Applicant

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1. This opinion contains indications relating to the following items:

☒ Box No. I — Basis of the opinion

☐ Box No. II — Priority

☐ Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

☐ Box No. IV — Lack of unity of invention

☒ Box No. V — Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

☐ Box No. VI — Certain documents cited

☐ Box No. VII — Certain defects in the international application

☐ Box No. VIII — Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Date of completion of this opinion 19 December 2006 (19.12.2006)	Authorized officer Bhavesh Mehta Telephone No. 571-272-7453

Form PCT/ISA/237 (cover sheet) (April 2005)

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒   the international application in the language in which it was filed

   ☐   a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a.   type of material

        ☐   a sequence listing

        ☐   table(s) related to the sequence listing

   b.   format of material

        ☐   on paper

        ☐   in electronic form

   c.   time of filing/furnishing

        ☐   contained in the international application as filed.

        ☐   filed together with the international application in electronic form.

        ☐   furnished subsequently to this Authority for the purposes of search.

3. ☐   In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement under Rule 43 *bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims NONE	YES
	Claims 1-19	NO
Inventive step (IS)	Claims NONE	YES
	Claims 1-19	NO
Industrial applicability (IA)	Claims 1-19	YES
	Claims NONE	NO

2. Citations and explanations:

Please See Continuation Sheet

Supplemental Box
In case the space in any of the preceding boxes is not sufficient.

V. 2. Citations and Explanations:
Claims 1-10 lack novelty under PCT Article 33(2) as being anticipated by Ratnakar
(US Patent 6,574,372 B2).

Regarding claim 1, Ratnakar discloses a method comprising:

a)   Providing a block of IWT (integer wavelet transform) coefficients for

at least one frequency sub-band of an image (inherent feature upon the output of

a wavelet);

b)   determining a mean value (or "D C coefficient" in col. 8, lines 55,56)

of said coefficients within said block;

c)   establishing an encoded mean value (via fig. 2,num. 24) to embed

one of a logical-0 bit value and a logical-1 bit into said first block (the remaining

limitation is not given patentable weight since the an active step of embedding

has not be claimed; thus the remaining limitation is interpreted as intended use).

Regarding claim 2, Ratnakar discloses the of claim 1 wherein said

establishing comprises:

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a)   maintaining said mean value unchanged (via a "los sless" in the

abstract method which is interpreted that the DC value is unchanged to the

lossless method that retains values and not loses the values) to embed a logical-

0 value into said block (see claim 1 with respect to intended use).

Regarding claim 3, Ratnakar discloses the method of claim 1 wherein said

establishing comprises:

a)   changing said mean value (via fig. 7,num. 33) to embed a logical-1

bit value into said block (see claim 1 with respect to intended use) .

Regarding claim 4, Ratnakar discloses the method of claim 1 further

comprising:

a)   not using modulo-256 addition (since Ratnakar does not disclose

using modulo-256 addition, Ratnakar is interpreted to not use modulo-256

addition as claimed).

Regarding claim 5, Ratnakar discloses the method of claim 1 further

comprising:

a)   avoiding truncation of grayscale values (since Ratnakar does not

disclose avoiding truncation of grayscale values, Ratnakar is interpreted to avoid

truncation since Ratnakar does not disclose truncation).

Regarding claim 6, Ratnakar discloses the method of claim 1, further

comprising:

a)   correcting any erroneous bit arising from said establishing using

error code correction (or "re ducing...error" in col. 8, line 47).

Regarding claim 7, Ratnakar discloses the method of claim 1, further

comprising:

a)   identifying a distribution of grayscale values (or "cla ssifies each

block [with "intensities" in col. 3, line 41] " in col. 3, line 37) of pixels in a spatial-

domain block affected by said IWT coefficients; and

b)   customizing said establishing (via a constant code length of "11

bits" in col. 8, line 60) according to said grayscale-value distribution.

Regarding claim 8, Ratnakar discloses the method of claim 1 wherein said

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IWT coefficients comprise:

    LL1 coefficients (inherent feature of wavelets as disclosed in Ratnakar).

    Regarding claim 9, Ratnakar discloses the method of claim 3 wherein said changing comprises:

    a)   shifting at least one coefficient of a block in HL1 sub-band by a shift quantity (or "s hift...by 2...[or shift]...by 5" in col. 15, line 47 to col. 16, line 2).

    Regarding claim 10, Ratnakar discloses the method of claim 9 wherein said changing further comprises:

    a)   shifting at least one coefficient of an associated block in an LL1 sub-band by about one quarter (or shift "by 5 inste ad of 7" in col. 16, line 2 or shift "2 instead of 4" in col. 16, line 1 is interpreted as the claimed **about** (emphasis added) one quarter) of said shift quantity.

    Claims 11-19 lack novelty under PCT Article 33(2) as being anticipated by Donescu (US Patent 6,633,652 B1).

    Regarding claim 11, Donescu discloses a method, comprising:

    a)   dividing IWT (integer wavelet transform) coefficients for at least one frequency band of an image into a plurality of non-overlapping blocks (as shown in fig. 8);

    b)   determining a mean value of coefficients (as shown in fig. 19,num. E51) within a first block of said blocks; and

    c)   modifying said mean value of said coefficients (as done in fig. 19,num. E52) to embed one or more bits of data (interpreted as intended use; see claim 1).

    Regarding claim 12, Donescu discloses the method of claim 11 further comprising:

    a)   identifying at least one coefficient eligible for modification by said modifying and at least one coefficient to remain unchanged during said modifying (this limitation corresponds to a watermark as disclosed in Donescu's title).

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Regarding claim 13, Donescu discloses the method of claim 11 where said

modifying said mean value comprises:

a)   adding a shift quantity to said mean value (as shown by a " + " sign

associated with a mean value "Mк" in fig. 19, num. E55).

Claim 14 is similar as claim 13. Thus, argument similar to that

presented above for claim 13 is equally applicable to claim 14.

Claim 15 is addressed the same as claim 11 except for the additional limitation of:

a)   comparing said mean value (or "low frequency coefficients" in col. 6, line 31 corresponding to

fig.12, label "Coefficients Y$_{ij}$") to a threshold (fig. 12, num. E13); and

b)   extracting a bit value (fig. 12, num. E17) from said block based on said comparing.

Regarding claim 16, Donescu discloses the method of claim 15 wherein said extracting comprises:

a)   extracting a logical-1 bit value (via fig. 12,num. E17) from said block if an absolute value of said

mean value exceeds an absolute value of said threshold (fig. 12,num. E13).

Claim 17 lacks novelty the same as claim 16. Thus, argument similar to that presented above for claim 16 is

equally applicable to claim 17.

Regarding claim 18, Donescu discloses the method of claim 15 further comprising:

a)   correcting any bit error arising from said extracting employing error correction code decoding (or

"check bit" as shown in fig. 2,num 31).

Regarding claim 19, Donescu discloses the method of claim 16 further comprising:

a)   reducing the absolute value of said mean value by a shift quantity (via a minus sign, "-" in fig.

19,num. E55) used during a preceding data embedding step (fig. 19,num. E54) only if said reducing does not cause an

overflow or underflow condition for grayscale values of pixels in a spatial-domain block affected by said first block

(since a check for the "Last pixel ?" in fig. 14,label E20 is performed that processes all pixels leaving no pixels omitted

thus preventing an underflow of pixels to be examined).